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IS 11438 (1985): Functional requirements for air cargo unit load devices transport vehicles (UTV) [TED 14: Aircraft and Space Vehicles]

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“Knowledge is such a treasure which cannot be stolen”





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*Indian Standard*

## FUNCTIONAL REQUIREMENTS FOR AIR CARGO UNIT LOAD DEVICES TRANSPORT VEHICLE ( UTV )

**1. Scope**— Covers the functional requirements of a unit load device ( ULD ) transport vehicle capable of carrying unit load devices over airport and public roads and transferring them to/from rollerized ULD handling equipment.

### **2. Dimensions and Weights of Unit Load Devices**

**2.1** Dimensions ( length × width × height ) and weights of applicable unit load devices are as follows:

- a) 1 562 mm × 1 534 mm × 1 626 mm, maximum gross weight 1 588 kg;  
*Note*— The overall length of the container may be up to 2 337 mm.
- b) 3175 mm × 2 235 mm × up to 2 438 or 2 997 mm, maximum gross weight 6 804 kg;
- c) 3 175 mm × 2 438 mm × up to 2 438 or 2 997 mm, maximum gross weight 6 804 kg;
- d) 2 991 mm × 2 438 mm × 2 438 mm, maximum gross weight 5 670 kg;
- e) 6 058 mm × 2 438 mm × up to 2 438 or 2 977 mm, maximum gross weight 11 340 kg; and
- f) 12 192 mm × 2 438 mm × 2 438 mm, maximum gross weight 20 412 kg.

### **3. Structure and Overall Dimensions of the Vehicle**

**3.1** The vehicle shall be constructed on a standard automotive truck, trailer or semi-trailer chassis. It shall provide a ULD transport platform with one of the following capabilities:

- a) two 2 235 mm × 3 175 mm or 2 438 mm × 3 175 mm units, or four 1 562 mm × 1 534 mm units, or one 2 438 mm × 6 058 mm unit;
- b) three 2 235 mm × 3 175 mm or 2 438 mm × 3 175 mm units, or six 1 562 mm × 1 534 mm units; or one 2 438 mm × 6 058 mm unit; and
- c) four 2 235 mm × 3 175 mm or 2 438 mm × 3 175 mm units, or eight 1 562 mm × 1 534 mm units, or two 2 438 mm × 6 058 mm units, or one 2 438 mm × 12 192 mm unit.

**3.2** The overall height of the entire loaded unit shall not exceed 3 965 mm when transported on roads with 2 438 mm high ULDs.

**3.3** The height of any part of the conveyor surface shall be within the range of 1 219 mm to 1 575 mm under any normal operating conditions.

**3.4** The overall dimensions and weight of the vehicle shall satisfy all applicable national or international regulations for road vehicles used on public roads. A greater maximum weight may be allowed within an airport at reduced speeds, in accordance with local airport regulations.

**3.5** The vehicle shall be capable of supporting and restraining in the three directions ( fore and aft, sideways, upward ) the following loads:

- a) 1 588 kg on any one single 1 562 mm × 1 534 mm unit position;
- b) 6 804 kg on any one single 3 175 mm unit position;
- c) 11 340 kg on any one single 6 058 mm unit position or two 3 175 mm unit positions; and
- d) 20 412 kg on any one single 12 192 mm unit position or four 3 175 mm unit positions.

**3.6** The clearance under the vehicle shall satisfy the current automotive industry practice for road vehicles.

#### **4. Platform Design, Guide Rails and Stops**

**4.1** The platform shall provide a roller surface, allowing longitudinal movement of load units.

**4.2** The platform shall be designed for powered end transfer of load units. The powered system shall be divided into as many sections as the platform can accommodate 3 175 mm units. It shall be possible to control these sections individually or collectively.

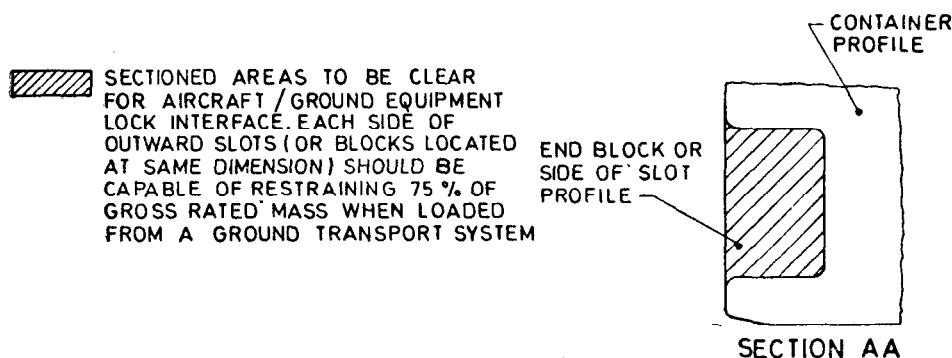
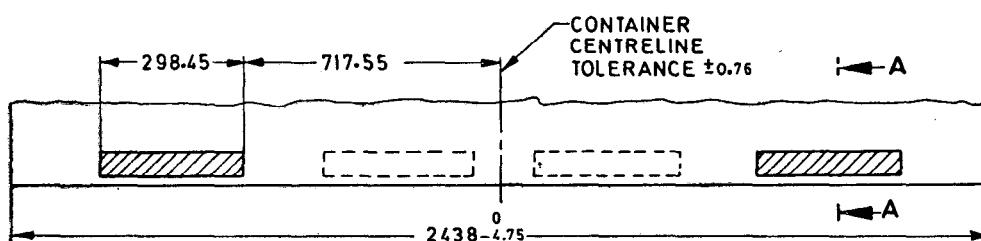
**4.3** The powered system shall be able to drive loaded units at a speed of approximately 0.3 m/s.

**4.4** Guide rails, at least 102 mm high, in accordance with IS : 11437 - 1985 'Ground equipment requirement for compatibility with aircraft unit load device' shall be provided along both sides of the platform. They can be retractable in order either to meet the applicable national or international overall width requirements, when carrying units 2 438 mm wide, or to allow for the opening container doors on the vehicles.

**4.4.1** They shall be adjustable symmetrically to ensure either guidance and side restraint of units 2 235 mm wide or guidance of units 2 438 mm wide on each section 3 175 mm long.

**4.4.2** When applicable, any spacing between guide rail ends shall not exceed 763 mm. In order to minimize impact loads, the guide rails located at the transfer end of the platform shall be laterally adjustable to form a distinct funnel-shaped lead-in, with a minimum angle of 15° and 203 mm extra width between guide rails.

**4.5** Restraint devices shall be provided on the platform to restrain unit load devices (see 2) in forward, aft, side and upward directions. They shall ensure restraint of each individual unit at its maximum gross weight each restraint device being capable of withstanding 75 percent of the total load (see Fig. 1).

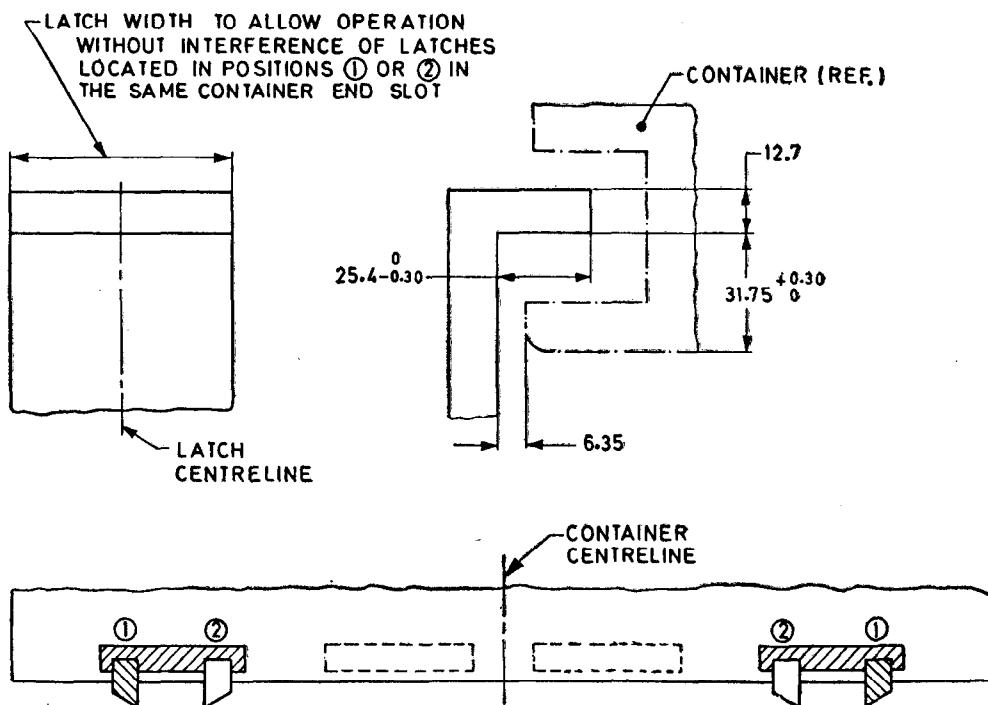


All dimensions in millimetres.

FIG. 1 PALLET/CONTAINER END SLOTS OF BLOCKS ( BOTH ENDS )

**4.5.1** In addition, they shall withstand the impact of the largest acceptable unit, at its maximum gross weight, travelling at a speed of 0.3 m/s.

**4.5.2** The shape and dimensional tolerances of restraint devices are shown in Fig. 2.



Note — 12.7 cumulative clearance between latches ① and outer container blocks, or latches ② and inner container blocks.

All dimensions in millimetres.

FIG. 2 LATCH DIMENSIONS

**4.6** Size (a) units as given in **2.1** with base dimensions 1 562 mm × 1 534 mm shall be guided into position with their 1 534 mm side along either of the guide rails, adjusted to the 2 235 mm width position. They shall be restrained on the three other sides of the their base.

**4.7** The base of sizes (b), (c), (d), (e) and (f) units as given in **2.1** shall be end-restrained at two points at each end, as shown in Fig. 1.

**4.7.1** Size (b) units as given in **2.1** shall be side-restrained by the guide rails adjusted to the 2 235 mm width position.

**4.7.2** Sizes (c), (d), (e) and (f) units as given in **2.1** shall be side-restrained either by the guide rails adjusted to the 2 438 mm width position, or by the end restraint devices interfacing with the side restraint end blocks located on the 2 438 mm side of the unit, as shown in Fig. 1.

## 5. Platform Operation and Loading

**5.1** The platform shall be such that one man standing at ground level, without tools of any kind, is able to operate it.

**5.1.1** All power systems and restraint devices controls shall be accessible from one side of the vehicle, and shall be located in such a way as not to expose the operator to injury and to guard against inadvertent operation of the platform during ULD transfer or road transportation.

**5.2** A manual override system shall be provided in the event of a power system failure. Manual overside shall be achieved by the operator, without the use of tools and within the time period of 1 min.

**5.3** Platform design shall permit manual movement of unit load devices, and shall provide adequate walk area for that purpose. A walk area for two men shall be provided in the centre of the platform. Each walk area shall be made of an antiskid material and be at least 300 mm wide.

**5.4** The mechanical efficency of the conveyor system shall be equal to or in excess of 97 percent, when measured with the maximum unit weight.

**5.5** In order to ease the transfer of unit load devices from and to the vehicle and to absorb the initial impact load, lead-in-rollers shall be provided that have the maximum possible diameter compatible with the design and in any case, not less than 100 mm.

**5.5.1** Two rows of lead-in rollers shall be provided, the first row being installed lower than second one in order to cope with bridging and cresting conditions.

**5.5.2** The distance between the centre line of the first row of rollers and the extreme projector of the vehicle structure shall not exceed 127 mm.

**5.6** The distance between the first powered drive element and the extreme projection of the vehicle structure shall not exceed 508 mm.

**5.7** Resistant padding shall be provided at the transfer end of the structure to prevent equipment damage during docking.

**5.8** Personnel handrails are not required on the platform.

**5.9** The power for operating the platform conveyor system may be supplied either by a self-contained power unit or by means of an external electric power supply.

**5.9.1** The external electric power shall be supplied at the transfer ends (rear left side) of the vehicle (from the transferring equipment or a fixed facility), and as an option, at the connection with the towing vehicle, for a trailer or semi-trailer vehicle.

**5.9.2** In both cases, a standard electric power connection shall be provided for the purposes of easy interface.

## **6. Mobility and Stability**

**6.1** The vehicle shall be capable of being driven at normal road speeds in accordance with applicable government regulations.

**6.2** The choice of the basic standard automotive chassis shall take into account the need to keep the overall dimensions and the swept turning radius to a minimum in order to allow the best possible vehicle manoeuvrability.

**6.3** During transfer operations, the combined suspension movement and normal type deflection shall not result in a variation in the level of any part of the conveyor surface outside the range of 1220 mm to 1575 mm nor a slope on the conveyor surface (in relation to a level ground surface) exceeding 2 percent.

## **7. Controls**

**7.1** All powered system control shall be located in one weather-proof box, located on the left side, at the transfer end of the vehicle.

## **8. Options**

**8.1** In addition to restraint provisions in 4.7, 2438 mm × 6058 and 2438 mm × 12192 mm pallets and containers may be restrained by twist-locks compatible with corner fittings in compliance with IS : 7694 - 1975 'Dimensions and general requirements of corner fittings for ISO series 1 freight containers'.

## **E X P L A N A T O R Y N O T E**

This Indian Standard gives minimum functional requirements for air cargo unit load device (ULD) chassis in accordance with the terminology defined in IS : 11436 - 1985 'General requirements for ground handling and transport systems equipment for air cargo unit load devices'. The term 'weight' is retained in this Indian Standard instead of the correct technical term 'mass' in order to conform to current commercial usage.

This standard is based on ISO/DIS 7716 'Air cargo unit load devices transport vehicle (UTV) — Functional requirements' issued by the International Organization for Standardization (ISO).